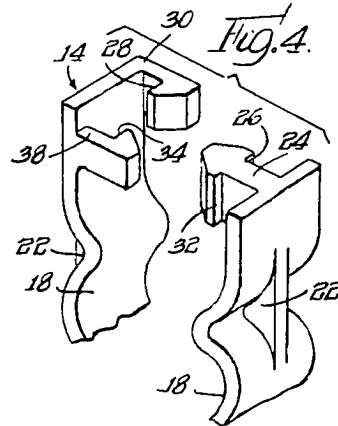
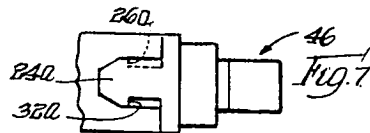
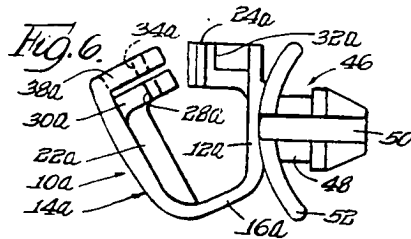
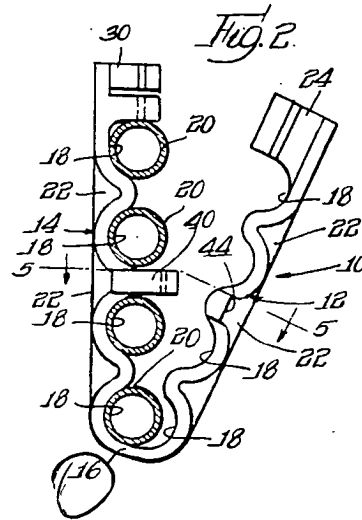
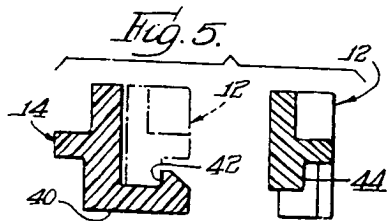
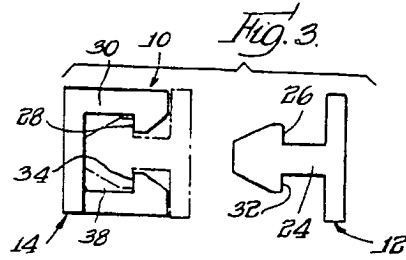
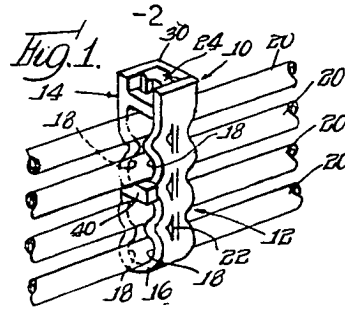


## COMPLETE SPECIFICATION

This drawing is a reproduction of  
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# PATENT SPECIFICATION

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DRAWINGS ATTACHED

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## (54) PLASTICS CLIPS

(71) We, ILLINOIS TOOL WORKS INC., a corporation organised under the laws of the State of Delaware, United States of America, of 8501, West Higgins Road, Chicago, Illinois 60631, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

According to this invention a one-piece plastics clip, for elongated elements such as conductors, comprises a pair of arms hingedly connected together and movable between a position spaced apart and a position adjacent to each other in which surface portions of the arms define an aperture for accommodating an elongated element, a stud on the free end of one arm projecting towards the other arm and having locking shoulders on opposite sides, and a pair of lugs on the free end of the other arm which project towards the one arm and are offset from each other both in the direction of the axis of hinging and along the length of the other arm, each lug having a shoulder arranged to snappingly engage with a respective one of the shoulders on the stud when the stud is pressed between the lugs, to thereby secure the free ends of the arms against undesired separation from the position adjacent to each other, the stud and lugs then cooperating to resist relative movement of the arms in the direction of the axis of hinging.

Examples of clips according to the invention will now be described, reference being made to the accompanying drawings in which:—

Figure 1 is a perspective view of a clip according to the present invention in operative association with a plurality of elongated elements;

Figure 2 is a side elevation of the clip of Figure 1, with the elongated arms thereof spaced apart in position to receive the elongated elements;

[Price 25p]

Figure 3 is a plan view of the clip shown in Figure 2;

Figure 4 is a fragmentary perspective view of the upper portion of the clip arms in their separated relation as shown in Figure 2;

Figure 5 is a transverse section taken substantially along the line 5—5 of Figure 2;

Figure 6 is a side elevation of a clip of modified form; and

Figure 7 is a fragmentary plan view of the clip shown in Figure 6.

Referring now to the drawings, wherein like numerals have been employed to designate similar parts throughout the various Figures, a plastics clip 10 comprises a pair of elongated arms 12 and 14. These arms 12 and 14 are resiliently and hinged connected together at 16. The facing surfaces of the arms 12 and 14 are provided with arcuate surface portions 18.

These surface portions 18 are arcuate shaped to conform in general with the periphery of the elongated elements they are to accommodate. Thus when the arms 12 and 14 are moved into position adjacent to each other, as shown in Figure 1, the surface portion 18 on one arm cooperates with the complementary surface portion 18 on the opposite arm to define an aperture which corresponds to and conforms substantially with the cross-sectional shape of the element 20, such as a conduit or an electrical conductor. Thus a substantial circumferential extent of the element surface is gripped. In this position the cooperating surface portions 18 serve to closely embrace the elements 20. The plastics clip 10 is made of inherently resilient yet firm plastics material, which is electrically non-conductive, and is capable of being produced in one piece in a mould by conventional moulding methods. The inherent resilience of the plastics material cooperates to give a very firm, snug, fit of the arcuate sections 18 against the surface of the elongated work elements. In instances where increased lateral strength of the arms 12 and 14 is required, longitu-

dinal reinforcing ribs 22 may be employed. The plastics clip is resistant to corrosion which normally affects metallic fasteners.

The free ends of the arms can be secured together by the following self-interlocking structure. In the middle of the free end of the arm 12 is a stud 24 which extends towards the arm 14 and has shoulders 26, 32 on opposite sides, facing the arm 12. There is a pair of lugs 30, 38 on the arm 14, which project towards the arm 12. Each has a respective shoulder 28, 34 arranged to snapingly engage a respective one of the shoulders 26, 32 when the stud 24 is pressed between the lugs. The lugs bend and recover resiliently as this occurs. The lugs are offset from one another both in the direction of the axis of hinging (i.e. the vertical direction in Figure 3) and in the direction of the length of the arm 14 (i.e. the vertical direction in Figure 2). The latter offset enables the clip to be made in a mould without side coring. The location of the stud between the lugs as seen in Figure 3 means that the arms cannot be moved relatively to one another in the direction of the hinge axis (i.e. vertically in Figure 3). Moreover the stud cannot be withdrawn without damaging the parts. There is a possibility that the clip may be twisted, that is to say the free ends of the arms may rotate somewhat relatively to one another about an axis which in Figure 3 lies in the plane of the paper and extends from left to right. In consequence, in Figures 2 and 4 the lug 30 would move somewhat downwards and the lug 38 would move somewhat upwards. The shoulders 26, 32 are made to extend the full height of the stud 24, as seen in Figure 2, so as to ensure that, despite such twisting, the shoulders will remain in engagement with the respective shoulders 28, 34. As shown in Figure 3, the part of the stud 24 to the left of the shoulders 26, 32 fits closely between the shoulders 28, 34 and the arm 14, while the lugs 30, 38 fit closely against the arm 12.

It will be noted that the extent of projection of the stud 24 and the lugs 30, 38 on the free ends of the arms of the clips (in the left-to-right direction in Figures 2 and 3) is such as to provide spacers for the free ends of the arms when the shoulders are interlocked.

It has also been found advantageous for some purposes to provide interlocking means located at the mid-length of the arms 12 and 14. One intermediate interlocking means consists of a stud 40 formed integral with and extending laterally from the arm 14, the stud 40 being provided with a latching shoulder 42. This shoulder 42 is adapted to engage behind a complementary shoulder 44 on the arm 12 as shown in Figure 5. This intermediate locking becomes operative auto-

matically as the arms 12 and 14 are pressed together from the spaced position shown in Figure 2 to the adjacent position shown in Figure 1. The clip is adapted to accommodate and maintain in predetermined spaced relationship simultaneously a plurality of elongated elements.

Figures 6 and 7 show a clip which is modified compared with the clip of Figures 1 to 5. The clip 10 previously described is designed to accommodate a plurality of elongated elements of substantial individual diameter, whereas the clip designated generally by the numeral 10a in Figure 6 is designed to accommodate a single elongated element or a bundle of a plurality of elongated workpieces of relatively small diameter. The clip 10a differs also from the clip 10 in that it is formed integral with a fastener stud member designated generally by the numeral 46. The stud member 46 may be of conventional design, having a shank portion 48 which is longitudinally slotted at 50, and is provided with a resilient head portion 52 adapted to be pressed against a surface of a workpiece, for example a flat panel, after the shank 48 has been engaged in a complementary aperture in the workpiece.

Referring now more specifically to the clip 10a, it will be noted that it incorporates an arm 12a adjacent to and formed integral with the fastener head 52, and a complementary arm 14a hingedly connected with the arm 12a at 16a. The arm 14a may be moved towards and away from the arm 12a as a unit, and in order to lend rigidity to the arm 14a it is provided with a longitudinal reinforcing rib 22a.

The free upper ends of the arms 12a and 14a are provided with self-interlocking structures including a stud 24a projecting from the arm 12a. The stud 24a, like the stud 24 previously described, is provided with a shoulder 26a adapted to lock with a complementary shoulder 28a of a lug 30a. This engagement of the complementary shoulders 26a and 28a occurs when the free extremities of the arms 12a and 14a are pressed together. A shoulder 32a is also provided on the stud 24a, oppositely disposed from the shoulder 26a, and is adapted to lock behind a complementary shoulder 34a provided on a lug 38a. Particular attention is directed to the fact that the shoulders 26a and 32a each extend over a partial vertical extent of the stud 24a, as distinguished from the shoulders 26 and 32 of the previously described stud 24 which completely traverse the stud 24. The arrangement of the stud 24a, as shown in Figures 6 and 7, lends considerable strength to this region of the clip. This increase in stud strength and the provision of the reinforcing rib 22a counteract tendencies for the interlocking shoulders to become

inadvertently disengaged as the result of forces tending to twist the clip.

WHAT WE CLAIM IS:—

1. A one-piece plastics clip, for elongated elements such as electrical conductors, comprising a pair of arms hingedly connected together and movable between a position spaced apart and a position adjacent to each other in which surface portions of the arms define an aperture for accommodating an elongated element, a stud on the free end of one arm projecting towards the other arm and having locking shoulders on opposite sides, and a pair of lugs on the free end of the other arm which projects towards the one arm and are offset from each other both in the direction of the axis of hinging, and along the length of the other arm, each lug having a shoulder arranged to snappingly engage with a respective one of the shoulders on the stud when the stud is pressed between the lugs, to thereby secure the free ends of the arms against undesired separation from the position adjacent to each other, the stud and lugs then cooperating to resist relative movement of the arms in the direction of the axis of hinging.

2. A clip as claimed in claim 1, wherein the shoulders on the stud only partially traverse the stud.

3. A clip as claimed in claim 1 or claim

2, wherein portions of the arms at their mid-length are adapted to engage each other to additionally secure the arms against undesired separation.

4. A clip as claimed in any preceding claim, wherein the arms have a plurality of surface portions which in the adjacent position define a plurality of apertures for accommodating elongated elements.

5. A clip as claimed in any preceding claim, including a fastener shank extending therefrom for supporting the clip in an aperture in a panel.

6. A clip as claimed in any preceding claim, wherein the said other arm has a longitudinal reinforcing rib.

7. A plastics clip substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 5, or Figures 6 and 7 of the accompanying drawings.

8. An assembly of a clip as claimed in any preceding claim and an elongated element in the aperture, the surface portions being shaped correspondingly to the cross section of the element whereby the arms closely embrace the element.

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